

CLAIMS

1. A desalination method for raw water comprising the steps of :

(1) supplying raw water into a confined space means;

5 (2) evacuating said confined space means and depressurizing an inside thereof;

(3) supplying low-temperature waste heat into said confined space means so as to subject said low-temperature waste heat and said raw water in said confined space means
10 to heat exchange and generate water vapor in said confined space means; and

(4) cooling said water vapor to obtain distilled water.

2. A desalination method claimed in claim 1, wherein said confined space means comprises a single evaporation can.

15 3. A desalination method claimed in claim 1, wherein said confined space means comprises a plurality of evaporation cans which are connected in series, wherein said low-temperature waste heat is supplied into a first evaporation can, and wherein in each pair of adjacent evaporation cans,
20 the downstream-side can receives water vapor from an upstream-side evaporation can, cools the water vapor with raw water in the downstream-side evaporation can and thereby produces distilled water, and also heats the raw water in the downstream-side evaporation can and generates water
25 vapor.

4. A desalination method claimed in claim 1, wherein said confined space means comprises a plurality of evaporation cans which are connected in parallel rows, wherein said

steps of (1) to (4) are switched over from one evaporation can to another to thereby enable a continuous desalinating operation.

5. A desalination method claimed in any one of claims 1 to 4, wherein said step of evacuating is effected intermittently or at an optional time.

6. A desalination method claimed in claims 5, wherein said step of evacuating is effected for a predetermined period upon starting the desalinating operation.

7. A desalination method claimed in any one of claims 1 to 6, wherein said step of supplying a raw water into said confined space means is effected by evacuating said confined space means while opening the confined space means to a raw water source.

8. A desalination method claimed in claim 1, further comprising a step of discharging concentrated raw water out of said confined space means, said discharging step is effected, after opening said confined space means to the atmosphere, by opening said confined space means and allowing flowing down of said concentrated raw water therefrom.

9. A desalination apparatus comprising: a heat exchanger cooperating with an evaporation can so as to subject low-temperature waste heat and raw water in the evaporation can to heat exchange and generate water vapor in the evaporation can; a condenser cooperating with a raw water tank so as to receive the water vapor from said evaporation can, cool the water vapor by subjecting the water vapor and raw water in

the raw water tank to heat exchange and obtain distilled water; a distilled water tank for storing said distilled water; vacuum means for evacuating said evaporation can and depressurizing an inside thereof so as to promote generation of water vapor in said evaporation can; and raw water supply means for supplying raw water to said evaporation can.

10. A desalination apparatus comprising: a heat exchanger cooperating with an evaporation can so as to subject low-temperature waste heat and raw water in the evaporation can to heat exchange and generate water vapor in the evaporation can; a condenser adapted to receive the water vapor from said evaporation can, cool the water vapor by subjecting the water vapor and cooling water to heat exchange and obtain distilled water; a distilled water tank for storing said distilled water; vacuum means for evacuating said evaporation can and depressurizing an inside thereof so as to promote generation of water vapor in said evaporation can; and raw water supply means for supplying raw water to said evaporation can.

11. A desalination apparatus according to claim 9 or 10, wherein said low-temperature waste heat is potential heat of exhaust steam from a steam turbine for electric power generation in a plant.

12. A desalination apparatus according to claim 11, wherein said desalination apparatus is incorporated in series and/or parallel to a condenser of said steam turbine for electric power generation or is used in place of said condenser.

13. A desalination apparatus according to claim 9 or 10, wherein a plurality of evaporation cans are provided, said heat exchanger being arranged to cooperate with a first evaporation can, and wherein said condenser is arranged such
5 that in each pair of adjacent evaporation cans, the downstream-side evaporation can receives water vapor from an upstream-side evaporation can, cool the water vapor with raw water in a downstream-side evaporation can and thereby produce distilled water, and also heat the raw water in the
10 downstream-side evaporation can and generate water vapor.

14. A desalination apparatus according to any one of claims 9 to 13, wherein said desalination apparatus further comprises control means for controlling the operation of said vacuum means and opening and closing of a control valve
15 connected to said evacuation can.

15. A desalination apparatus according to claim 14, wherein said control means controls said vacuum means and said control valve so that an operation of evacuating said evaporation can and an operation of opening said evaporation
20 can to the atmosphere are intermittently repeated.

16. A desalination apparatus according to claim 14 or 15, wherein a plurality of evaporation cans are disposed in parallel rows each consisting of at least one evaporation can, said control means controls said vacuum means and said
25 control valve so that said evaporation cans in all said rows do not simultaneously open to the atmosphere, thereby enabling continuous operation.

17. A desalination apparatus according to any one of

claims 14 to 16, wherein said raw water supply means is formed by said vacuum means and said control valve connected to the lower part of said evaporation can that is opened or closed by said control means.

5 18. A desalination apparatus according to any one of claims 14 to 17, said desalination apparatus further comprises concentrated raw water discharge means for discharging concentrated water from said evaporation can.

10 19. A desalination apparatus according to claim 18, wherein said concentrated raw water discharge means is formed by said control valve connected to the lower part of said evaporation can that is opened or closed by said control means.

15 20. A desalination apparatus according to any one of claims 10 to 17, wherein said evaporation can, heat exchanger, condenser, distilled water tank, vacuum means and raw water supply means are unitized in a single frame.

20 21. A desalination apparatus according to claim 18 or 19, wherein said evaporation can, heat exchanger, condenser, distilled water tank, vacuum means, raw water supply means and concentrated raw water discharge means are unitized in a single frame.

25 22. A desalination apparatus according to claim 20 or 21, wherein plural of said desalination apparatus unitized in a single frame are further assembled in a single unit.